

## CLAIMS

What is claimed is:

- Sub 100*
1. A method of manufacturing a multi-chip module system comprising:  
forming a substrate for use in said multi-chip module system, the substrate having at least a first position for locating a first semiconductor device thereat and having at least one other vacant position for locating a second semiconductor device thereat on the substrate;  
installing a first semiconductor device in the first position of the substrate;  
determining if the multi-chip module system has an unacceptable semiconductor device; and  
repairing the substrate to have an acceptable semiconductor device by installing a second semiconductor device in the other vacant position in the substrate.
  2. The method of claim 1, further comprising:  
installing a known-good-die in the at least one other vacant position on the substrate for use in a multi-chip module system.
  3. The method of claim 1, further comprising:  
testing said multi-chip module system for compliance with pre-determined operational characteristics for the second semiconductor device.
  4. The method as defined in claim 1, further comprising:  
repairing the substrate for use in a multi-chip module system to have an acceptable semiconductor device thereon by installing a second semiconductor device having an adapter attached thereto, the adapter having to be operably installed in the at least one other vacant position in the substrate.

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6. The method as defined in claim 5, further comprising:  
testing said multi-chip module system to ensure compliance with pre-determined operational characteristics for the second semiconductor device.

7. A method of manufacturing a multi-chip module system comprising:  
forming a substrate for use in said multi-chip module system, the substrate having at least a first position for locating a first semiconductor device thereat and having at least one other vacant position for locating a second semiconductor device thereat on the substrate;  
installing a first semiconductor device in the first position of the substrate;  
determining if the multi-chip module system has an unacceptable semiconductor device; and  
repairing the substrate to have an acceptable semiconductor device by installing a second semiconductor device in the other vacant position in the substrate, the second semiconductor device comprising a known-good-die.

8. The method of claim 7, further comprising:  
testing said multi-chip module system to ensure compliance with pre-determined operational characteristics for the second semiconductor device.

Summary

9. A method of manufacturing a multi-chip module system comprising:  
forming a substrate for use in said multi-chip module system, the substrate having at least a first position for locating a first semiconductor device thereat and having at least one other vacant position for locating a second semiconductor device thereat on the substrate;  
installing a first semiconductor device in the first position of the substrate;  
determining if the multi-chip module system has an unacceptable semiconductor device; and  
repairing the substrate to have an acceptable semiconductor device thereon by installing a second semiconductor device having an adapter attached thereto, the adapter to be operably installed in the other vacant position in the substrate.

10. The method of claim 9, further comprising:  
installing a known-good-die having an adapter attached thereto, the adapter having to be operably installed in the other vacant position in the substrate for use in a multi-chip module system as the second semiconductor device.

11. The method as defined in claim 10, further comprising:  
testing said multi-chip module system for compliance with pre-determined operational characteristics for the second semiconductor device.

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12. A method of manufacturing a multi-chip module system comprising:  
forming a substrate for use in said multi-chip module system, the substrate having at least first and second positions thereon, the first and second positions for locating a first and second semiconductor device thereat, and having at least one other vacant position for locating a third semiconductor device thereat on the substrate;  
installing a first and second semiconductor device in the respective first and second positions of the substrate, the first and second semiconductor devices each having a predetermined performance capability;  
determining if the multi-chip module system has an unacceptable semiconductor device thereon;  
disabling the circuitry connected to the unacceptable semiconductor device; and  
repairing the substrate to have an acceptable semiconductor device thereon by installing a third semiconductor device in the one other vacant position in the substrate, the third semiconductor device installed in the one other vacant position having a predetermined performance capability.

13. The method of claim 12, further comprising:  
removing the unacceptable semiconductor device from the substrate.

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14. A method of manufacturing a multi-chip module system comprising:  
forming a substrate for use in said multi-chip module system, the substrate having at least first and second positions for locating a first and second semiconductor device thereat, and having at least one other vacant position for locating a third semiconductor device thereat;  
installing a first and second semiconductor device in the respective first and second positions of the substrate, the first and second semiconductor devices each having a predetermined performance capability;  
determining if the multi-chip module system has an unacceptable semiconductor device thereon;  
disabling the circuitry connected to the unacceptable semiconductor device; and  
repairing the substrate to have an acceptable semiconductor device thereon by installing a third semiconductor device in the one other vacant position in the substrate, the third semiconductor device installed in the one other vacant position having a predetermined performance capability, the third semiconductor device comprising a known-good-die having a predetermined performance capability.

15. The method of claim 14, further comprising:  
testing said multi-chip module system for compliance with pre-determined performance capability for the third semiconductor device.

16. The method of claim 15, further comprising:  
repairing the substrate for use in a multi-chip module system to have an acceptable semiconductor device thereon by installing a third semiconductor device in the one other vacant position in the substrate, the third semiconductor device installed in the one other vacant position having a predetermined performance capability of the combined predetermined performance capability of the first and the second semiconductor device.

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17. A method of manufacturing a multi-chip module system comprising:  
forming a substrate for use in said multi-chip module system, the substrate having at least first and second positions thereon, the first and second positions each for locating a first and second semiconductor device thereat, and having at least one other vacant position for locating a third semiconductor device thereat on the substrate;  
installing a first and second semiconductor device in the respective first and second positions of the substrate, the first and second semiconductor devices each having a predetermined performance capability;  
determining if the multi-chip module system has an unacceptable semiconductor device thereon;  
disabling the circuitry connected to the unacceptable semiconductor device; and  
repairing the substrate to have an acceptable semiconductor device thereon by installing a third semiconductor device having an adapter attached thereto, the adapter for installation in the other at least one vacant position in the substrate.

18. The method of claim 17, further comprising:  
installing a known-good-die as a third semiconductor device having an adapter attached thereto, the adapter for installation in the at least one other vacant position in the substrate for use in a multi-chip module system as the third semiconductor device.

19. The method as defined in claim 18, further comprising:  
testing said multi-chip module system for compliance of the third semiconductor device with the pre-determined performance capability for the third semiconductor device.

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20. The method of claim 17, further comprising:  
forming a substrate for use in said multi-chip module system, the substrate having at least a first position having a first mounting configuration for a semiconductor device thereat, having a second position having a second mounting configuration for a semiconductor device thereat different than the first mounting configuration, and having at least one other vacant position having, in turn, a predetermined configuration for locating a third semiconductor device thereat on the multi-chip module system.

21. The method of claim 20, further comprising:  
configuring one other vacant position located on the substrate to have a predetermined semiconductor mounting configuration for corresponding to the first mounting configuration of the first semiconductor device and for corresponding to the second mounting configuration of the second semiconductor device.

22. The method of claim 21, further comprising:  
configuring the location of the one other vacant position located on the substrate such that on one side of the substrate the one other vacant position has a predetermined semiconductor mounting configuration which corresponds to the first mounting configuration of the first semiconductor device; and  
forming on the other side of the substrate a second vacant position that has a predetermined configuration for corresponding to the second mounting configuration of the second semiconductor device.

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23. A method of manufacturing a multi-chip module system comprising:  
forming a substrate for use in said multi-chip module system, the substrate having at least a first position for a semiconductor device to be located thereat, having a second position having a second mounting for a semiconductor device to be located thereat different than the first position, and having at least one other vacant position for locating a third second semiconductor device thereat on the multi-chip module system;  
installing a first semiconductor device in the first position of the substrate;  
determining if the multi-chip module system has an unacceptable semiconductor device thereon;  
disabling the circuitry connected to the unacceptable semiconductor device; and  
repairing the substrate to have an acceptable semiconductor device thereon by installing a second semiconductor device in the other vacant position in the substrate.

24. The method of claim 23, further comprising:  
wherein the third semiconductor device includes a known-good-die in the other vacant position on the substrate for use in a multi-chip module system.

25. The method as defined in claim 23, further comprising:  
configuring the at least one other vacant position located on the substrate to have a predetermined semiconductor mounting configuration for corresponding to the first mounting configuration of the first semiconductor device and for corresponding to the second mounting configuration of the second semiconductor device.

26. The method of claim 23, further comprising:  
removing the unacceptable semiconductor device from the substrate.



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27. The method of claim 23, further comprising:  
configuring the location of the at least one other vacant position located on the substrate such that  
on one side of the substrate the at least one other vacant position has a predetermined  
semiconductor mounting configuration for corresponding to the first mounting  
configuration of the first semiconductor device; and  
forming on the other side of the substrate a second vacant position that has a predetermined  
configuration for corresponding to the second mounting configuration of the second  
semiconductor device.

28. The method of claim 23, further comprising:  
installing a third semiconductor chip in the at least one other vacant location, the third  
semiconductor chip having a predetermined mounting configuration for corresponding to  
the first mounting configuration of the first semiconductor device.

29. The method of claim 23, further comprising:  
installing a third semiconductor chip in the at least one other vacant location, the third  
semiconductor chip having a predetermined mounting configuration for corresponding to  
the second mounting configuration of the second semiconductor device.

30. The method of claim 27, further comprising:  
installing a third semiconductor chip in the at least one other vacant location on one side of the  
substrate, the third semiconductor chip having a predetermined mounting configuration  
for corresponding to the first mounting configuration of the first semiconductor device.

31. The method of claim 27, further comprising:  
installing a third semiconductor chip in the second vacant location on the other side of the  
substrate, the third semiconductor chip having a predetermined mounting configuration  
for corresponding to the second mounting configuration of the second semiconductor  
device.

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32. The method of claim 31, further comprising:  
disabling the circuitry connected to the unacceptable semiconductor device.

33. The method of claim 31, further comprising:  
removing the unacceptable semiconductor device from the substrate.

34. A method of manufacturing a multi-chip module system comprising:  
forming a substrate for use in said multi-chip module system, the substrate having at least a first position for locating a semiconductor device thereat, having a second position having a second mounting configuration for locating a semiconductor device thereat different than the first position, having at least a first vacant position having, in turn, a third configuration for locating a third semiconductor device thereat on the substrate, and having a second vacant position having, in turn, a fourth configuration for locating a fourth semiconductor device thereat on the substrate;  
installing a first semiconductor device in the first position of the substrate, the first semiconductor device having a first performance capability;  
installing a second semiconductor device in the second position of the substrate, the second semiconductor device having a second performance capability;  
determining if the multi-chip module contains an unacceptable semiconductor device thereon;  
determining if the unacceptable semiconductor device is the first semiconductor device;  
configuring the first vacant position located on the substrate to have a third semiconductor mounting configuration for corresponding to the first position of the first semiconductor device;  
configuring the second vacant position located on the substrate to have a fourth semiconductor configuration for corresponding to the second mounting configuration of the second semiconductor device; and  
installing a third semiconductor device having the performance capability of the unacceptable semiconductor device in one of the first vacant position or the second vacant position.

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35. The method of claim 34, further comprising:  
configuring the second vacant position located on the substrate to have a fourth predetermined semiconductor configuration for corresponding to the second predetermined mounting configuration of the second semiconductor device.

36. The method of claim 34, further comprising:  
configuring the location of the first vacant position to be located on the substrate on one side thereof such that one side of the substrate has the first vacant position thereon having a third predetermined semiconductor mounting configuration for corresponding to the first predetermined mounting configuration of the first semiconductor device; and  
configuring the location of the second vacant position to be located on the other side of the substrate such that the second the second vacant position has a fourth predetermined configuration for corresponding to the second predetermined mounting configuration of the second semiconductor device.

37. The method of claim 34, further comprising:  
installing a third semiconductor device having the performance capability of the first semiconductor device if the first semiconductor device is determined to be unacceptable.

38. The method of claim 34, further comprising:  
determining if the unacceptable semiconductor device is the second semiconductor device.

39. The method of claim 38, further comprising:  
installing a fourth semiconductor device having the performance capability of the second semiconductor device if the second semiconductor device is determined to be unacceptable.

40. The method of claim 34, further comprising:  
removing the unacceptable semiconductor device from the substrate.

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41. The method of claim 34, further comprising:  
disabling the circuitry connected to the unacceptable semiconductor device.

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